

Where do Engineering Graduates go?



Destinations of Higher Education Leavers

Each year the Higher Education Statistics Agency (HESA) carries out a survey of *Destinations of Leavers from Higher Education (DLHE)*, which provides information on the patterns of employment, further study and training or other activities of students six months after completion of their Higher Education (HE) course. This briefing paper examines the latest set of data for 2006/7¹ to establish exactly where HE leavers from Engineering & Technology (E&T) subject areas are going, what they are doing, and how this ties in with employer views on skills issues as found in the *National Employers Skills Survey 2007*.

The Engineering and Technology Board (ETB), is an independent organisation that promotes the vital role of engineers, engineering and technology in our society. The ETB partners business and industry, Government and the wider engineering and technology community: providing evidence on the state of engineering; sharing knowledge within engineering; and inspiring young people to choose a career in engineering, matching employers' demand for skills.

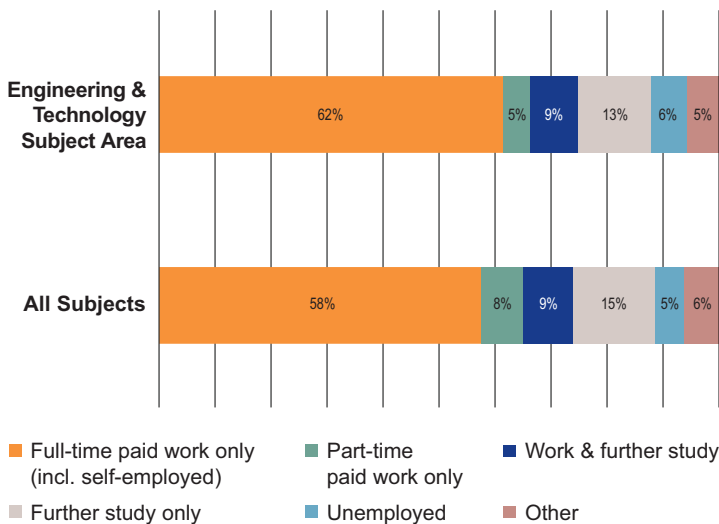


Graduate Destinations

Graduates leaving university have a number of options to choose from including, but not exclusively, direct employment. The latest HESA data show that UK-domiciled E&T² subject area leavers have a higher employment conversion rate than all subject leavers with 62% entering full-time, paid employment compared to 58% of all subject leavers. Engineering and Technology graduates are also slightly less likely to engage in further study (13% versus 15%), (Figure 1).

This suggests that there is a better push and/or pull effect to/from employment for Engineering and Technology graduates than there is for all those graduates in other subject areas combined.

Figure 1: Destinations of UK-domiciled All Subjects Versus Engineering and Technology Subject Area Leavers who Obtained All Qualifications Through Full-time Study 2006/07



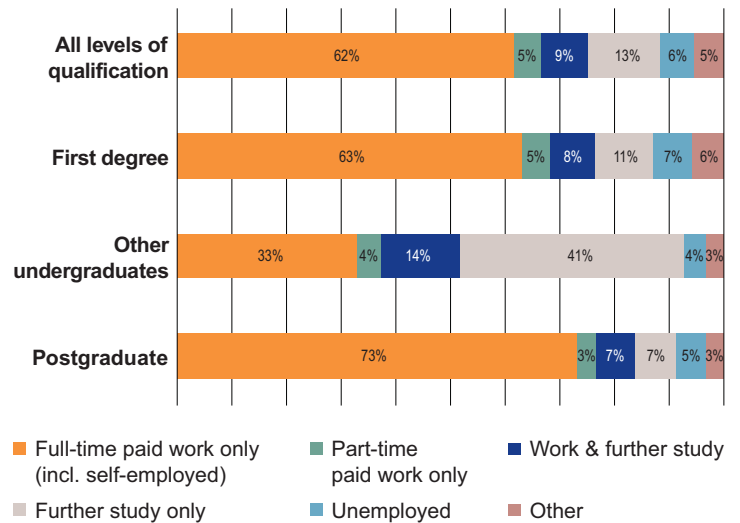
Source: Higher Education Statistics Agency Limited 2008 (HESA)

A comparison of Engineering and Technology leavers by level of study (Figure 2) shows that those with postgraduate qualifications are far more likely to enter full-time paid employment (73%) than those with first degrees (63%). Perhaps unsurprisingly, first degree graduates are more likely to go onto further study (8%) or to be without work (11%), than postgraduates (both 7%).

These findings make it clear that any expectation for substantially more than two-thirds of HE students to enter Engineering occupations will be limited by the students own desire to engage in further learning or undertake some other form of activity e.g. a gap year.

It has been widely suggested that a large proportion of Engineering and Technology graduates entering employment do not work in Engineering occupations or for Engineering employers. In order to test this assumption a detailed analysis of HESA DLHE data was undertaken. The findings of this analysis are presented in two ways; as the occupations undertaken and as the type of employer.

Figure 2: Destinations of UK-domiciled Engineering and Technology Graduates who Obtained Qualifications Through Full-time Study 2006/07



Source: Higher Education Statistics Agency Limited 2008 (HESA)

Occupations Undertaken

An analysis of Engineering and Technology graduates entering employment by Standard Occupational Classification (SOC) codes gives an insight into the type of occupation that they are pursuing. This can be grouped according to whether the employee is definitely an Engineer or Technician, or in a role which may be associated therewith or is in an occupation which is not related to Engineering or Technology.

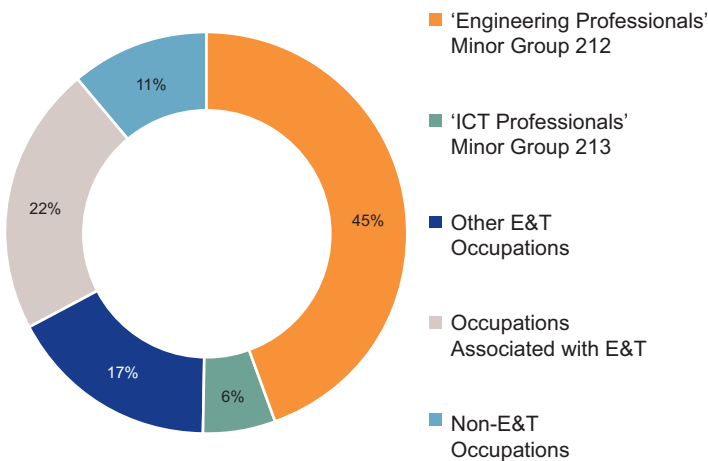
By far the two largest occupational groups which graduates enter are 'Engineering Professionals' (SOC 2000 Major Group 212) and 'ICT Professionals' (213) (Figure 3), which, combined, account for over half (51%) of all those leavers entering employment. When combined with the other E&T occupations (17%) and occupations associated with Engineering (22%) categories, this makes up the vast majority of roles entered into (89%).



² Engineering & Technology subject area is JACS codes 'H' and 'J'. Full details of JACS can be found at www.hesa.ac.uk/jacs.



Figure 3: Destination Occupations of All UK-domiciled Engineering and Technology Graduates who Obtained First Degrees and entered employment by Standard Occupational Classification (SOC) Codes 2006/07



Source: Higher Education Statistics Agency Limited 2008 (HESA)

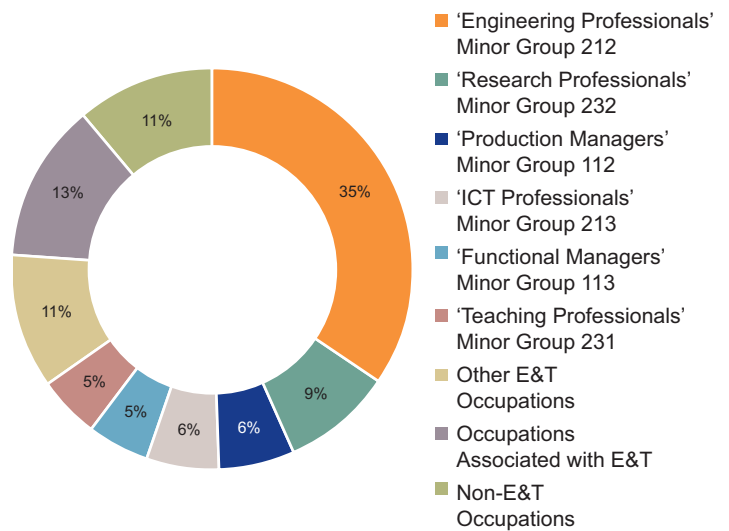
Overall, nine-out-of-ten first degree E&T graduates entering employment took up occupations that were E&T related. Contrary to popular opinion only one tenth of E&T graduates entered roles that were non-E&T occupations. This further reduces to one in 15 graduates once those leavers who do not go into employment are taken into account.

An examination of postgraduate employment routes shows that the top six SOC 2000 Major Group destination occupations³, comprising 89% of postgraduate leavers, include significant E&T roles, senior management and educational occupations which are very likely to be strongly Engineering-related (Figure 4).

Less than 11% of postgraduate leavers have entered occupations that are unrelated to Engineering.

Overall, the occupation destination data demonstrates a very high conversion rate of E&T leavers to E&T roles. Any desired increase in this proportion will be limited by this fact.

Figure 4: Destination Occupations of All UK-domiciled Engineering and Technology Subject Area Leavers who Obtained Postgraduate Qualifications and Entered Employment by Standard Occupational Classification (SOC) Codes 2006/07



Source: Higher Education Statistics Agency Limited 2008 (HESA)

Types of Employer

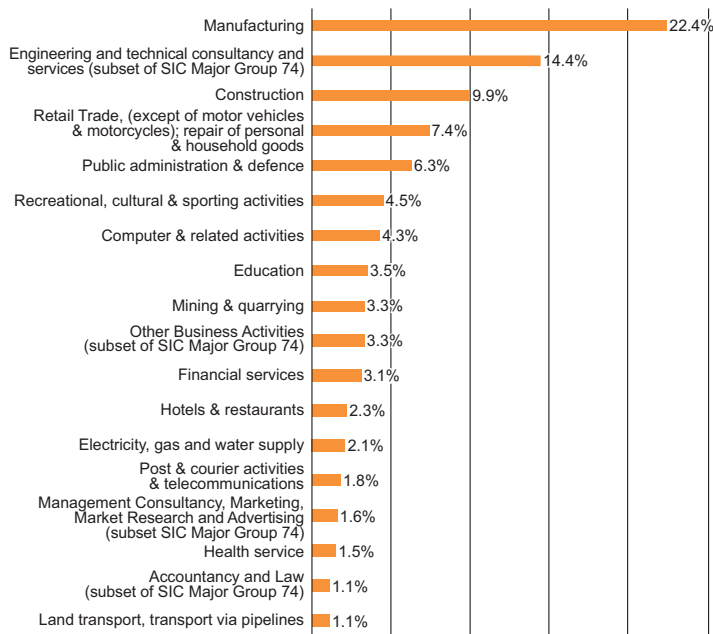
Another way to look at destinations is to examine the types of employers which E&T leavers have gone to work for. Employers' main economic activity can be classified by Standard Industrial Classification (SIC) codes and these are included in the HESA HDLE data. It should be noted that SIC codes reflect what employers consider to be their main economic activity and that this does not necessarily reflect what work is actually undertaken by the employer. In other words, Engineers or Technicians may work in an E&T role at an employer whose main activity may be categorised as being something other than E&T.

It is often remarked that a large proportion of E&T HE leavers "go to work in the City". However, our analysis makes it clear (Figure 5) that of the 63% with a first degree in E&T who enter employment, just 3.1% go to work for an employer in financial services, compared to 6.6% of all subject leavers who do so. Consequently, E&T graduates are actually less than half as likely (Index 47) as all subject first degree graduates, to enter employment with a financial services employer.

Even if the scope is extended to encompass business and management consultancy, marketing, market research and advertising, these together take just 1.6% of E&T first degree leavers. Accountancy and law employers combined constitute only 1.1% of E&T leavers. The total 'City-type' non-E&T occupations right across the UK is just 5.8% of leavers.



Figure 5: Employer Destinations for All UK-domiciled Engineering and Technology Subject Area Leavers who Obtained First Degrees and Entered Employment by Standard Industrial Classification (SIC) Code Primary Activity of Employer 2006/07

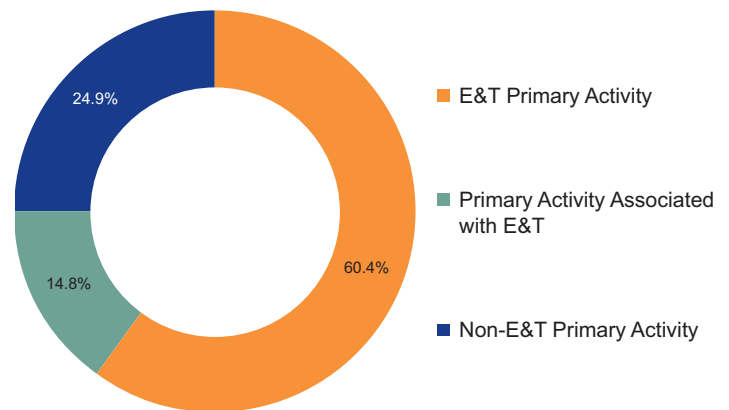


Source: Higher Education Statistics Agency Limited 2008 (HESA)

Thus the vast majority of leavers go to work for employers whose primary activity is in E&T. The two biggest categories are manufacturing and Engineering consultancy and services. This latter group comprises a combination of four-digit SIC codes contained within the SIC Major Group 74 (usually labelled "Other Business Activities"). This has perhaps, led to a simple misinterpretation as representing non-E&T employers.

By categorising employers along similar lines to those used when reviewing occupations, it can be shown that three quarters (75.2%) of E&T leavers go to work for an employer whose primary activity is in, or directly related to, E&T (Figure 6).

Figure 6: Employer Destinations for All UK-domiciled Engineering and Technology Subject Area Leavers who obtained First Degrees and Entered Employment by Standard Industrial Classification (SIC) Code Primary Activity of Employer 2006/07



Source: Higher Education Statistics Agency Limited 2008 (HESA)

These data differ from those for occupations (63%) because although the primary activity of an employer may not be in E&T, particular roles with that employer may well be in E&T occupation.

This level of analysis therefore suggests that of the 24.9% E&T graduates working for employers whose primary activity is not E&T, a substantial proportion are, in fact, undertaking E&T occupations at those employers.

These data indicate a healthy conversion from HE into E&T related occupations and employers. What is not yet explored is to what extent is there a shortage of Engineers and Technicians and what evidence there is that suggests there are problems in recruitment from HE. The next section looks at robust Government-sponsored research into this area.

Skills Shortages within E&T

The National Employers Skills Survey (NESS)⁴ 2007 published in May 2008 was produced by the Learning and Skills Council (LSC)⁵ in partnership with the Department for Innovation, Universities and Skills (DIUS)⁶ and UK Commission for Employment and Skills (UKCES)⁷.

The findings provide some insight into the true extent of skills shortages across English businesses and industry, which can be analysed by sector. Examining employers that fall into the SIC footprint of SEMTA⁸, (the Sector Skills Council for Science, Engineering and Manufacturing Technologies), we find that:

- + Just under one-in-five employers (19%) said they had vacancies. These vacancies, however, account for 2.0% of employment (ie one-in-fifty roles are vacant).
- + Less than one-in-ten employers (9%) said they had hard-to-fill vacancies (HTFVs). These vacancies accounted for just over a third of vacancies (38%) but just 0.7% of employment.

⁷ <http://www.ukces.org.uk/>

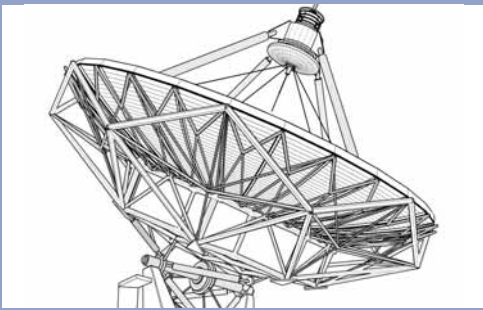
⁸ Based on 3,335 employer interviews with a *maximum* standard error of +/- 1.63% for findings of 50% at 95% confidence.

⁴ Based on a total un-weighted sample of 79,018 employers in England

⁵ <http://www.lsc.gov.uk/>

⁶ <http://www.dius.gov.uk/>





+ Around one-in-twelve employers (8%) said they had skills shortage vacancies (SSVs). These vacancies accounted for just under a third of vacancies (31%) or just 0.6% of employment.

These data indicate that the vast majority of Engineering employers do not face significant skills recruitment problems and that such problems exist in only a small proportion of roles.

So, why is there such a widely held perception that there is a major shortage of Engineers? Perhaps the answer lies in understanding what employers mean by a 'shortage of Engineers'.

Occupational Skills Shortage Vacancies

Although the vast majority of E&T employers claim that they do not face skills shortages, an analysis of the Skills Shortage Vacancies (SSVs) by SOC Code provides an indication of where the major issues lie (Figure 7).

The greatest area of skills shortage, accounting for just over two-fifths of SSVs, is in the Skilled Trades occupations. These include, for example; metal working production and maintenance fitters, motor mechanics, auto Engineers, electricians, electrical fitters and steel erectors.

The next largest category (17%) is Process, Plant and Machine Operatives, which includes; chemical and related process operatives, quarry workers, energy plant operatives, routine laboratory testers, and rail construction and maintenance operatives.

These two largest groups of skills shortage occupations, combined with the Associate Professional and Technical Occupations (e.g. Engineering technicians, architectural technologists, and laboratory technicians), account for three fifths (61%) of SSVs, but only 21% of first degree HE E&T leaver occupations.

The Professional Occupations (e.g. chemical, civil, mechanical or electrical engineers, or ICT professionals) account for 55% of first-degree HE E&T leavers' employment but only account for 15% of SSVs.

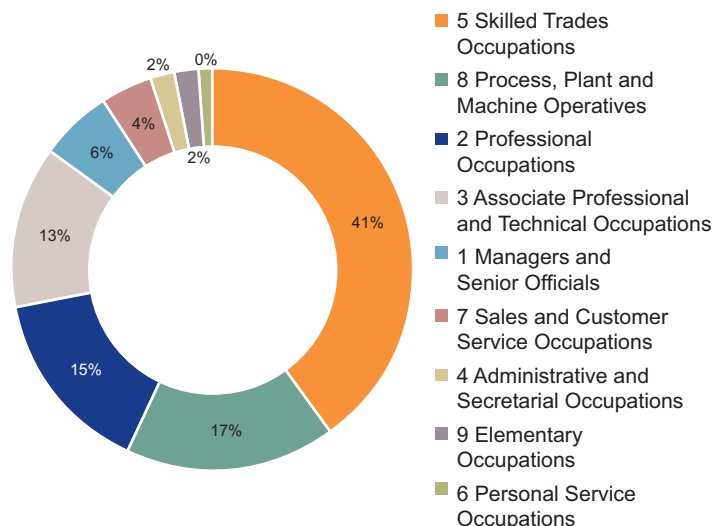
This clearly indicates that where Skills Shortage Vacancies exist they are in occupations where an HE qualification is not necessarily a requirement and for which a Further Education (FE) route is more likely to be the progression route into employment. Consequently, rather than confirm a shortage of graduates, we have instead highlighted the significant shortage of technician-level Engineers in more junior occupational groups.

So, why do so many complain about a shortage of graduate Engineers? The answer may lie with what those asserting that this problem exists, actually mean. There is qualitative evidence⁹ showing that finding young Engineers with the qualifications, experience, competences and skill sets required by the employer plus being prepared to work for the level of salary of offer, may be difficult to find. Additionally data from the NESS 07 survey indicates that:

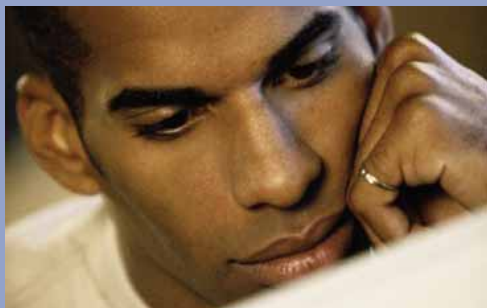
- + A quarter of SEMTA SIC footprint employers (24%) recruit under-24-year-olds straight from education, but just 7% specifically from HE.
- + Of the 7% of employers who recruited from a university or HE institution, around one-in-six (17%) stated that these recruits were poorly or very poorly prepared for work – a figure which widely applies across other Engineering sub-sectors.

This evidence indicates that graduates with poor employment skills may be being interpreted by employers as a 'shortage' – ie there a mismatch between employer and HE leaver expectations.

Figure 7: Share of Skills Shortage Vacancies at Employers Covered by the SEMTA Footprint by SOC Major Group Occupation Codes



Source: National Employers Skills Survey (England) 2007



Conclusions

- + Our analysis of the DLHE data provided by HESA¹⁰, shows clearly that the substantial majority (about nine out of ten) of E&T students leaving HE and entering employment begin careers as Engineers and Technicians for employers whose main activities are in Engineering and Technology.
- + There is a widely-held perception that a large proportion of E&T HE leavers “go to work in the City”. Our analysis of HESA and NESS data has shown that this is not the case; only 3.1% go to work for an employer in financial services, anywhere (not just the City of London), compared to 6.6% of all subject leavers. Destination data have been previously mis-interpreted, with assumptions being made about what occupations and types of employers are included under the “business and finance” category, without an appreciation of its content.
- + Generalisations have been made about E&T “skills shortages” which require more detailed examination and understanding to fully comprehend the nature and extent of the problems encountered and why they exist. This area has been further compounded by the observation that the terms “skills shortages” may be being used loosely to cover poor preparation for work or “skills gaps” in the existing workforce.
- + The greatest area of skills shortage accounting for over 60% of skills shortage vacancies is actually in the Skilled Trades occupations, Associate Professional and Technical occupations where an HE qualification is not necessarily a requirement.
- + Whilst there does appear to be something of a mismatch between specific employer requirements and graduate qualifications, competences, skills and experience, this is not related to HE leavers pursuing alternative sector careers. Rather it is a function of the increasingly specialised and specific nature of individual E&T occupations. This has, to some extent been recognised through the creation of employer-led National Skills Academies (NSAs)¹¹ now active in Construction, Food & Drink Manufacturing, Nuclear, Manufacturing, and Process Industries.



Next Steps?

Whilst this paper has provided an analysis of the problems facing E&T employers, it is clear that we need to improve our understanding of the personal attitudes and motivations of E&T leavers if we are to find ways to increase the proportion of such leavers entering employment overall and to identify where the skills shortages lie.

We call therefore on E&T stakeholders engaged with the skills agenda to join us in developing a robust, objective primary research project to establish why issues persist and how they can be addressed effectively.

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¹⁰ For further information, please contact HESA: <http://www.hesa.ac.uk/> and the LSC: <http://www.lsc.gov.uk/>
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¹¹ <http://www.nationalskillsacademy.co.uk/>

If you have any comments related to this briefing, please send them to: feedback@etechb.co.uk

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